

**VIT**

Vellore Institute of Technology

Vellore - 632014, Tamil Nadu, India

**School of Electrical Engineering**  
**Fall Semester 2023-24**  
**Continuous Assessment Test - 1**

**SLOT: B2+TB2**

Programme Name &amp; Branch : B.Tech &amp; EEE, EIE

Course Code: BEEE204L

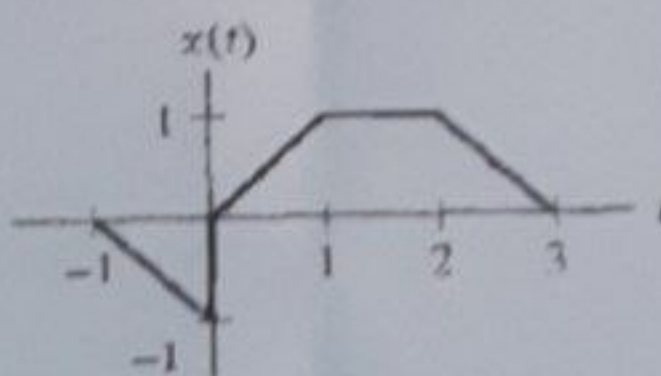
Course Name : Signals and Systems

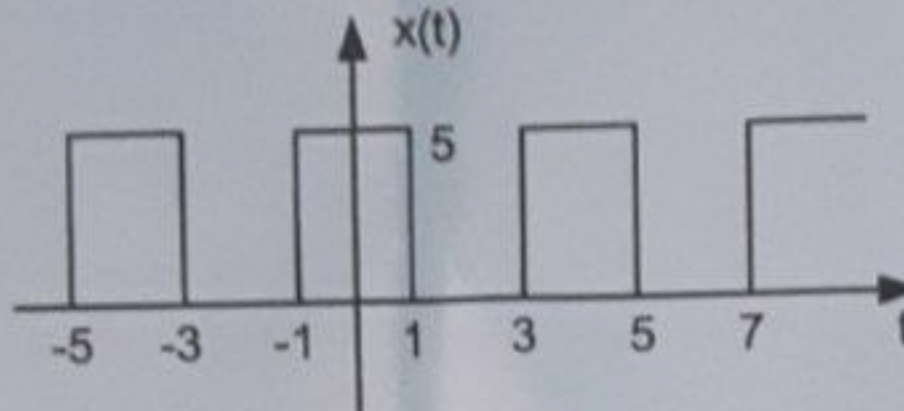
Faculty Members : Dr. Maddela Chinna Obaiah, Dr. Yuvapriya T

Class Number(s) : VL2023240104112, VL2023240102905

Date of the Examination : 11-09-2023 (02:00PM - 03:30PM)

**Duration : 90 minutes****Max. Marks : 50****General instruction(s): Answer all questions.**

| Q. No | Question                                                                                                                                                                                                                                                                                           | Marks |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1.    | a) Give the mathematical and graphical representation of any five basic signals.<br>b) Define energy and power signals. Find whether the signal $x[n] = \left(\frac{1}{4}\right)^n u[n]$ is energy or power signal and calculate their energy or power.                                            | 10    |
| 2.    | A continuous-time signal $x(t)$ is shown in Figure.<br><br>Sketch and label carefully the following signal:<br>(i) $x(t - 2)$<br>(ii) $x(4 - t)$<br>(iii) $x(2t - 3)$<br>(iv) $2x\left(t + \frac{1}{2}\right)$ | 10    |

|    |                                                                                                                                                                                                                                                                                                                                                           |    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 3. | <p>For the given input-output relationship, determine whether the corresponding system is memory or memoryless, stable or unstable, causal or noncausal, linear or nonlinear and time-variant or invariant.</p> $y[n] = x^2[2 - n]$                                                                                                                       | 10 |
| 4. | <p>The impulse response <math>h[n]</math> and input signal <math>x[n]</math> of discrete-time LTI system is presented below. Determine the system output <math>y[n]</math> using:</p> <p>a) Tabular method.</p> <p>b) Concentric circular convolution.</p> $h[n] = \left\{ \frac{1}{4}, 1, 0, 2 \right\}$ $x[n] = \left\{ \frac{1}{4}, 2, 3, -2 \right\}$ | 10 |
| 5. | <p>Determine the trigonometric Fourier series representation of the following signal.</p>                                                                                                                                                                             | 10 |